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ABSTRACT

The purpose of this project was to develop and implement an articulation program between fifth-grade elementary teachers and sixth-grade middle school teachers which would serve to enhance communications regarding the basic skill development of individual students in the area of mathematics. The vehicle for communications that was produced took the form of a basic skills checklist which was passed directly from one teacher to another. The commitment by teachers to this project was achieved as a result of in-service time and a summer workshop in which specific plans and procedures were implemented for a pilot program. As a result of this articulation program, department chairpersons were able to monitor the system of communication, the student misplacement rate with regard to the instructional program for sixth-grade students was significantly reduced, and the amount of instructional time for sixth-grade students during the first two weeks of school was more than doubled by eliminating the need for diagnostic testing. These improvements in the educational system enabled the teachers to plan more effective instructional programs by having "in hand" information regarding sixth-grade students, and provided increased class time for this instruction. (Author/MP)

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DEVELOPING AND IMPLEMENTING A MATHEMATICS ARTICULATION PROGRAM AT THE ELEMENTARY/MIDDLE SCHOOL LEVELS IN THE NEWARK SCHOOL DISTRICT

BY

KENNETH H. BROWN
CHAIRPERSON, MATHEMATICS DEPARTMENT
NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

1977

NOVA UNIVERSITY COLLEGE AVENUE, FORT LAUDERDALE, FLORIDA 33314 • 305/587-6660

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This practicum report was submitted in partial fulfillment of the requirements for the degree of Doctor of Education, Nova University National Ed.D. Program for Educational Leaders, Ft. Lauderdale, Fla.

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amount of instructional time for sixth grade students during the first two weeks of school was more than doubled by eliminating the need for diagnostic testing. These improvements in the educational system enabled the teachers to plan more effective instructional programs by having "in hand" information regarding sixth grade students, and provided increased class time for this instruction. Staff involvement was essential to the success of this project which has been recommended for extension to other grade levels and subject areas.

DEVELOPING AND IMPLEMENTING A MATHEMATICS ARTICULATION PROGRAM AT THE ELEMENTARY/MIDDLE SCHOOL LEVELS IN THE NEWARK SCHOOL DISTRICT

Submitted in partial fulfillment of the requirements for the degree of Doctor of Education, NOVA University

by

Kenneth H. Brown

Dover II Cluster
Dr. Randall L. Broyles, Coordinator
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Introductory
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Revision

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DEVELOPING AND IMPLEMENTING A MATHEMATICS ARTICULATION PROGRAM AT THE ELEMENTARY/MIDDLE SCHOOL LEVELS IN THE NEWARK SCHOOL DISTRICT

INTRODUCTION

During the 1976-77 school year, the need for better articulation between elementary (K-5) and middle schools (6-8) was given a high priority by the Deputy Superintendent for Instruction, Dr. John Allen, and the Director of Instruction, Dr. Loren J. Thompson, in the Newark School District. In seeking to strengthen existing avenues of communication, orientation programs as presented each June to incoming sixth grade students by middle school administrators were expanded to include guidance personnel and other staff members. The original objectives of this program were, and continue to be, aimed at students.

In concurrence with the Office of Instruction, the elementary curriculum area contact persons and the middle school department chairpersons recognized the absence of an articulation program aimed specifically at teachers. Several factors peculiar to the Newark School District caused this to become a more obvious problem than in the past. These factors were categorized as: (1) growth patterns within the school district; (2) pending court-ordered desegregation; and, (3) competency-based education.

The Newark School District experienced phenomenal growth within the past 20 years to become the largest school district in terms of student enrollment in the State of Delaware. The 17,000 students enrolled in the district were divided among 13 elementary schools, five middle schools, three high schools, and a vocational school. Eight new school buildings opened during the past decade. This growth resulted in repeated changes in attendance boundaries to accommodate existing, as well as new, facilities. A feeder system of one or two elementary schools into a middle school, was replaced by a system wherein numerous elementary schools may feed into more than one middle school. This diversified feeder system produced gaps in the close lines of communication that previously existed among school staff members.

The second factor which brought increased attention to the communication problem developed as a result of court ordered desegregation of the 11 school districts within New Castle County, Delaware. While the specific remedy to achieve desegregation remains pending, all students will spend at least three years outside of their home districts. For example, a student residing within the Newark School District could attend local schools for Grades K through 3, a "center school" for grades 4-6, and return to local

schools for grades 7-12. Without a formal approach to communication among school staffs, the continuity of the instructional program would be extremely difficult to maintain.

The final factor to be considered related to the Competency Education Program (CEP) as mandated by resolution of the Delaware State Board of Education in December of 1976. This program established two levels of competencies. Level I competencies included statements of basic skills and knowledge to be acquired by grade eight in the areas of mathematics, listening, speaking, reading, writing, and studying. Level II competencies required applications of knowledge and/or skills assumed to be necessary to success in life role functions. Fulfilling these competencies related to graduation requirements. In accordance with these statewide goals, the Newark School District developed a Model for the Improvement of Instruction. The components of this model included: (1) learner competencies or objectives; (2) prerequisites; (3) pre-assessment; (4) learning activities; (5) post-assessment; (6) remediation. The plan for implementation of this model required active teacher involvement. The need for teacher interaction through established lines of communication became obvious.

The success of this practicum depended greatly upon the suggestions and cooperation of the administration and staff of the following schools within the Newark School District:

Maclary Elementary School;

Medill Elementary School;

Wilson Elementary School;

Shue Middle School.

In addition, this effort would not have been possible without the support and encouragement of Dr. F. Neil Walzl, Supervisor of Mathematics, and the Office of Instructional Services.

THE PROBLEM

In the past, articulation methods employed between elementary and middle school teachers within the district consisted primarily of achievement and diagnostic record examination, informal teacher gatherings, a limited amount of in-service time, and program coordination by the district Supervisor of Mathematics. The Iowa Test of Basic Skills was administered to all students in grades three through eight in order to provide a record of student achievement as well as contributing to instructional program planning. In addition, it was a common practice for teachers to dedicate a significant amount of time at the

beginning of each school year to diagnostic and placement testing. Occasionally, friendships or social gatherings provided lines of communication from one school to another. In competition for in-service time with other areas of importance including parent conferences and desegregation matters, little time was available for formal programs of articulation. Since 1968 a full-time Supervisor of Mathematics, Dr. F. Neil Walzl, has been employed by the Newark School District. A student population growth of 30% during the last nine years served to render informal teacher-to-teacher coordination as an impossible task. Plans for the desegregation of schools consumed nearly 50% of the supervisors' time.

THE NEED

In considering the various aspects of the lack of formal articulation between elementary and middle school staffs, fifth and sixth grade teachers in particular, administrators and teachers concurred that existing conditions impeded the instructional program by using learning time for teacher decision-making. This lack of effective communication also caused the misplacement of already frustrated students who were not good test-takers, and prevented the efficient functioning of teachers by consuming time in record searching that could be better used for instructional activities.

A cumulative file containing such information as standardized test results, family background, and report card grades followed the student from the elementary school to the middle school. Rather than being placed directly in the hands of the teacher, this file remained in the middle school guidance office. Although teachers had access to this file, a randomly distributed survey (see Appendix A) of 50 elementary and middle school teachers revealed some interesting facts about the use of this information. Only one teacher in 10 reported a review of all student records within the first month of school. This fact was attributed to both the inconvenience and time consumption of such a review. Thus, the sixth grade teacher began program planning and student placement without "in-hand" knowledge of ability levels, materials and techniques of the previous teacher, or special needs of the student. Teachers reported that nearly 75% of instructional time during the first two weeks of school was consumed by diagnostic testing in order to partially fill this informational gap. This represented a time waste of approximately 5% of the total instructional program for the year. The significance of this time waste became apparent after reviewing the current literature regarding mastery learning. As has been pointed out by

such distinguished educators as Benjamin S. Bloom in his book Human Characteristics and School Learning (McGraw-Hill, 1976), increasing the amount of learning time should become the most important factor in mastery of subject matter.

It has been noted that no formal channel of communication existed among elementary and middle school teachers. There was no way for the middle school teacher to know what materials, instructional programs, or grouping techniques were most successful for an individual student. Having this type of information readily available to teachers should serve to enhance the curriculum planning for meeting the individual needs of students.

Decisions regarding student mastery of subject matter had been based primarily upon standardized test results. No provision existed for the fifth grade elementary teacher to communicate the level of attained competency to the sixth grade middle school teacher based on daily interaction with the student. Considering the common educational knowledge that all students cannot be measured successfully in standardized testing situations, a more accurate and personal account of student progress should be available in order to reduce the misplacement rate which was reported by some teachers to be as high as 50% (Appendix A).

Another factor requiring consideration related to the effective functioning of department chairpersons as facilitators of communication among grade levels. When questioned by this writer, the majority of chairpersons in the school district agreed that the absence of a formal procedure for ensuring adequate communication among teachers was directly related to misinterpretation of student needs and duplication of efforts. A monitoring system should be established in order to provide assistance to teachers in instructional planning.

In recognizing the needs that existed for increased instructional time, decreased misplacement rates for students, and a monitorable system of communication regarding the educational development of students, the following objectives were established.

OBJECTIVES

1. The sixth grade teachers will be able to increase the amount of instructional time by 75% during the first two weeks of school by eliminating the need for diagnostic testing of incoming students within the existing elementary/middle school feeder system as evidenced by a comparison with previous time allocations.

2. Based on daily interaction with students, the fifth grade teachers will be able to communicate the learning progress of individual students to sixth grade teachers with an accuracy rate of 80% as determined by the number of students requiring no change in their sixth grade instructional programs.

3. The District Supervisor and Department chairpersons will be able to ensure that formal lines of communication exist between schools by coordinating the transfer of information from fifth grade to sixth grade teachers of mathematics for at least 80% of the students.

STRATEGY

As chairperson of the Department of Mathematics and member of the Newark School District Advisory Board, this writer was in a unique position to affect desirable change in seeking to attain the above objectives with the full cooperation and support of the Office of Instruction.

As has been discussed, conditions peculiar to the Newark School District decreased the effectiveness of existing modes of articulation among staff. Various attempts to force articulation among teachers through required in-service activities had failed. The first alternative to be considered was an examination of the

literature to determine what vehicles for articulation were employed by other districts in communicating the basic skill development of individual students.

This search of the literature did not reveal successful articulation programs wherein the primary component was a vehicle for communication among teachers. Most districts yielded to a strictly competency-based testing program in mathematics such as Numerical Proficiency in Denver, Math Test, Form Y in St. Paul, Diagnostic Test at the Immaculate Conception Academy in Washington, D.C., and Mathematics: Graduation Requirements Competencies in Portland. Such programs were aimed at evaluating students rather than serving as a communication vehicle among staff. An ERIC search of the years 1966-1977 used the following descriptors: Mathematics Curriculum, Elementary School Mathematics, Articulation, Elementary Schools, Elementary School Teachers, Elementary School Students, Junior High Schools, Middle Schools, Junior High School Students, Curriculum Planning, and Curriculum Development.

Of the 100 prints produced by the ERIC search, only three related directly to local needs. The most recent of these was the Peterborough County Board of Education Mathematics Project (ED106141) aimed primarily at basic skills and problem solving in grades K-10. While

articulation of goals with a design for their evaluation was a component of this 1975 study, the focus of the project was the establishment of behavioral objectives with equivalent test items.

The second study which was conducted by Blanchard at the University of Chicago in 1971 (ED051045), concerned itself exclusively with the articulation problem between the first two years of the liberal arts college and the last two years of secondary school.

The third item to be examined proved to be the most relevant. The 1968-1969 Curriculum Bulletin Series (Mathematics, Grade 5) of the New York City Board of Education (ED-34698) contained procedures for articulation with Grade 4 mathematics and with the mathematics of Grades 6, 7, and 8. However, the objectives of this bulletin were not in congruence with those of the Newark School District with regard to basic skill development.

The results of this literature search led to the second strategy alternative. This alternative focused upon the development of an articulation program which would be unique to the needs of teachers within the Newark School District. Considerable evidence favored this approach.

Past experience had shown that the adaptation of "outside" plans often failed to establish the commitment needed from teachers to ensure success. For example, even though state curriculum guides were available, it was a

goal of the Newark School District during the past several years to develop curriculum guides for all major subject areas which were in accordance with State of Delaware guidelines, yet directed toward local needs. Teacher involvement in writing became a significant factor in the subsequent use of these guides. Likewise, active involvement and commitment of teachers in planning, developing, and implementing an articulation program unique to their needs should lead to success.

Therefore, it was proposed by this writer and the Office of Instruction that an articulation vehicle be developed with local teachers to provide information from one teacher to another regarding the basic skill development of individual students in the area of mathematics. This vehicle would take the form of a basic skills checklist which would indicate levels of attained mastery in accordance with the Newark School District Mathematics Curriculum Guide and State of Delaware Mathematics Objectives. In addition, this checklist would provide information between teachers regarding the types of programs and instructional activities employed by the previous teacher, as well as communicating special needs of the students.

Full permission and financing would be sought to institute a pilot program involving a middle school and its elementary feeder schools. This project would involve fifth and sixth grade teachers in the area of mathematics with hopes for expansion to other grade levels and subject areas.

These teachers would assist in planning summer workshop to develop the basic skills checklist. The purpose of this checklist would be to enable the sixth grade teachers to make decisions regarding appropriate ability placement for students without excessive diagnostic testing or record searching. The successful development, use, and validation of this basic skills checklist would lead to the attainment of the established objectives.

DESIGN

The process by which articulation was to be achieved began with discussions between Dr. F. Neil Walzl, Supervisor of Mathematics, and this writer. An outline was formulated for a basic skills checklist in mathematics to serve as the primary vehicle of communication among teachers (see Appendix B). An in-service day in April of 1977 provided the opportunity for a group of interested elementary and middle school teachers to discuss the problem of articulation. The proposed checklist was presented in draft form for teacher reaction. An enthusiastic response from the group led to commitment to the project and refinement of the draft. Discussions with the Office of Instruction brought approval for the project in May of 1977, and funding for a staff summer workshop to finalize plans for the implementation of the Basic Skills checklist in one elementary/ middle school feeder system. Because of teacher interest

and average size, the Wilmer E. Shue Middle School feeder system was selected for the pilot program. The elementary schools involved were Maclary, Medill, and Wilson.

With the cooperation of the administrators at the four schools, fifth and sixth grade teachers were solicited to participate in pilot usage of the draft checklist and/or the summer workshop. Full participation was achieved.

The fifth grade teachers assumed the responsibility for completing the checklist for all students assigned to the sixth grade at Shue Middle School in September of 1977. The sixth grade teachers agreed to apply the results of these checklists in lieu of diagnostic testing for the incoming students, and to administer a validating instrument within one month after the start of school.

During the summer of 1977, plans for the workshop were developed (see Appendix C). The planned activities included:

1. Modification of the existing draft version of the checklist based on pilot usage and teacher suggestions;
2. Development of procedures for validating the effectiveness of the checklist after use by the sixth grade teachers;
3. Development of guidelines for the placement of sixth grade students based upon checklist results;
4. Placement of incoming sixth grade students.

An agenda to include the above activities for the five day workshop was developed (see Appendix D). Ten days prior to the workshop date, a memorandum was sent to all participating teachers as a time/date reminder and mental stimulator for the planned activities (see Appendix E).

On August 15, 1977, seven teachers representing the participating schools met in the library of the Wilmer E. Shue Middle School. Also present were Dr. F. Neil Walzl of the Office of Instruction, and Mrs. Georgia Cressman, Chairperson of Mathematics at the Gauger Middle School. Dr. Walzl provided input as to district goals and objectives, while Mrs. Cressman served as a liaison with the nonparticipating middle schools of the district.

The draft version of the Pupil Math Skill Checklist was the first item to be considered (see Appendix B). Consideration was given to the appropriateness of content, mechanics of usage, and scoring of results. Based upon teacher suggestions and group discussion, a final verson of the Math Skills Checklist was developed (see Appendix F).

In accordance with the Newark School District Mathematics Curriculum Guide (K-8), the checklist took the form of a basic skills continuum with provisions for noting whether topics were introduced, reviewed, or mastered. The checklist was composed of three sections: (I) Computation, (II) Concepts, and (III) Applications. Within each section, mastery was defined as competence at the 70% level.

The teachers expressed a need for additional information regarding the instructional setting for the individual student. As a result of this concern, the cover page of the checklist was modified to include such information as instructional materials, grouping, and special program assignment, with space for teacher comment.

In order to enhance the objectivity of the sixth grade teacher in evaluating the checklist results for an individual student, a system was developed for numerical scoring of the checklist. The introduction of a specific skill carried a weighting of one (1), the review of a skill carried a weighting of two (2), and the mastery of a skill carried a weighting of three (3). In this manner, the total check marks in each column were translated to numerical values. Thus, it became possible to attach a score to each pupil checklist.

The workshop then addressed itself to an examination of the checklist results based upon pilot usage by the fifth grade teachers. This examination included those checklists submitted by the fifth grade teachers present at the summer workshop, as well as those unable to attend. A total of 247 checklists were examined, scored, and cross-referenced according to sixth grade homeroom assignment. Based upon student scores, instructional groups were established.

In order to numerically evaluate the effectiveness of the placement, the group developed a criterion-referenced validating instrument (see Appendix G). This instrument fulfilled a dual purpose. For the pilot schools, it became the tool for checklist evaluation. For other schools in the district, it became the first criterion-referenced mathematics test developed specifically in accordance with local objectives. In designing this instrument, a large variety of commercially produced testing materials were examined, but rejected in terms of local needs. It was decided that administration of the test would be a function of student completion, not time; a student response form and answer key were designed (see Appendix H). Validation of sixth grade placement was to be completed by October 1, 1977, followed by an analysis of the generated data. A correlation of .8 with the Math Skills Checklist was to be considered successful.

After the critique and proof of all products of the workshop, institutionalization of checklist usage was discussed. The group recommended that serious consideration be given by the Office of Instruction to the expansion of this project to other grades and content areas, contingent upon the successful completion of the practicum objectives.

The workshop was evaluated in two ways. The teachers completed the standard district evaluation form as recommended by the Office of Instruction (see Appendix I). In addition,

the teachers were asked to complete an evaluative instrument specifically related to the workshop activities (see Appendix J). The results of this evaluation were submitted to the Office of Instruction (see Appendix K). In summary, the workshop evaluation revealed the following:

1. The participants recognized their opportunity for input as a basic strength of the project;
2. The participants expressed great satisfaction with the flow of ideas among elementary and middle school staffs;
3. The participants demonstrated their commitment to the implementation of the project through the plans and procedures that were developed.

TIME LINE

It must be noted at this point that certain preliminary steps were taken, as indicated in the time line, prior to the submission of the proposal to NOVA University in order to secure educational and financial support from the Office of Instruction of the Newark School District.

Activity	Participants	Date
(1) Search of the literature	Writer	March-April, 1977
(2) Develop outline for checklist	Writer District Supervisor	April, 1977
(3) Elementary/middle school teachers reactions to the project	Writer Math Supervisor Teachers	April 28, 1977
(4) Refine instrument for pilot usage	Writer	May, 1977

Activity	Participants	Date
(5) Gain final approval for summer workshop	Writer Office of Instruction	May 17, 1977 1977
(6) Solicit fifth grade teachers to apply usage of checklist; complete checklists	Writer Math Supervisor Elementary Principals	May- June, 1977
(7) Solicit sixth grade teachers to apply results of checklist	Writer Math Supervisor Middle School Principals	May- June, 1977
(8) Register workshop participants	Office of Instruction	June 8, 1977
(9) Submit practicum proposal	Writer	July, 1977
(10) Finalize workshop plans	Writer Math Supervisor	August 1, 1977
(11) Preliminary examination of checklist results from pilot usage	Writer	July- August, 1977
(12) Conduct workshop	Writer Elementary Teachers Middle School Teachers	August 15-19, 1977 Shue School
(13) Sixth grade teachers complete validating instrument	Teachers	September, 1977 - third week of school
(14) Compare results of checklist with validating instrument; analyze data; evaluate results	Writer	September, 1977
(15) Prepare and submit report for district on results of project	Writer	November, 1977

Activity	Participants	Date
(16) Prepare draft of Practicum Report for NOVA, except for final evaluation, for the purpose of enabling the observers to do a pre-analysis	Writer	December, 1977
(17) Final report developed and submitted to NOVA		December, 1977

REQUIRED INPUTS

The following inputs (man hours and financial) were necessary for the successful completion of this practicum:

1. Man hours

a. Personal (initial contacts, literature search, development of materials, planning, conducting workshop, analysis of data, evaluation reports, etc.).	300 hours
b. Teachers (use of checklist, workshop, follow-up activities, evaluation, etc.)	225 hours
c. Secretarial	20 hours
d. Others (Supervisor of Mathematics, Principals, other administrators)	75 hours

2. Funds (Workshop)

a. Teacher stipends at $5.40/hour	$1215.00
b. Supplies	$20.00

All expenses necessary for the successful completion of this practicum were borne by the Newark School District. The use of school facilities was approved and reserved.

EVALUATION - FORMATIVE

For purposes of statistical analysis, five of the 10 heterogeneous homeroom sections were chosen at random for the sample population. These 147 sixth grade students represented half of the total population.

1. The actual amount of instructional time in mathematics during the first two weeks of school was compared with the amount of time consumed by the sixth grade teacher in the previous year in order to compute the percent of increase in instructional time:

Instructional time (1977)	=	2000 minutes
Diagnostic test time (1977)	=	0 minutes
Instructional time (1976)	=	800 minutes
Diagnostic test time (1976)	=	1200 minutes

Percent of increase = 150%

The above time calculations were based upon teacher records for instructional and testing time of 25 class periods per week during the initial two weeks of school. This increase of 150% doubled the established success level for this objective (75%).

2. At the end of the third week of school, based upon suggestions from the guidance department, teacher observation, and the results of the checklist validating instrument, the students requiring changes in their instructional levels were identified. The number of misplaced students was compared to the total sample population in order to determine an accuracy rate:

Total sample population	=	147
Total number of changes	=	2
Misplacement rate	=	1.4%
Accuracy rate	=	98.6%

An 80% level of accuracy was to be considered as success for this objective. The successful placement rate of 98.6% was extremely high; it led this writer to question the results. The decision was made to re-examine the number of changes made within the ability groupings after the first 10 weeks of school. With no further changes being made by the sixth grade team at that time, the results were confirmed.

3. In order to examine the actual communication that existed between the elementary teacher and the middle school teacher, the total number of completed checklists was compared with the total sixth grade enrollment:

Total completed checklists = 247
Total enrollment = 295
Rate of completion = 83.7%

The 80% level of success for this objective was exceeded. An examination of the actual student population revealed that the majority of students for whom no checklist existed were new to the feeder system (transfers) and/or school district.

EVALUATION - SUMMATIVE

Within four weeks after the opening of school in September, 1977, the sixth grade teachers administered the validating instrument developed during the summer workshop. This instrument was criterion-referenced to the checklist items (see Appendix G).

In order to provide for further analysis of the reliability of fifth grade checklist results, the subsection scores for Part I, Part II, and Part III, as well as the total score from the validating instrument, were

paired with the checklist scores for statistical evaluation. The complete data on individual student scores can be found in Appendix L. The statistical results derived from this data are located in Appendix M. Of primary interest was the Pearson Correlation Coefficient.

When the checklist scores were paired with the total score from the validating instrument, a correlation of .7693 was obtained. Rounded to the nearest tenth, this constituted success which had been established at the .8 level. An examination of the subsection data revealed that the highest correlation with the checklist was in Part II (.7629); the lowest correlation was with Part I (.5949). This data led to the conclusion that the checklist was most reliable when compared with the total range of mathematical competencies including computation, concepts, and applications as represented by the three parts of the validating instrument. Thus, the total weighted score resulting from use of the basic skills checklist was most indicative of the composite achievement level of the individual student in mathematics. This served to simplify the application of checklist results for teachers.

As a result of this articulation program, the educational system was improved by increasing the amount of available instruction time, decreasing the rate of misplacement of

students with regard to ability levels, and providing a tool to ensure avenues of communication between teachers. All these factors contributed to the teacher's awareness for planning more effective instructional programs to meet student needs.

A complete report of this practicum was submitted to the Office of Instruction. The use of the Math Skills Checklist has become a part of the educational system.

FURTHER APPLICATIONS

Although this project was designed for the elementary/middle school levels in mathematics, further use within the Newark School District may be three-dimensional. A similar approach could be employed by other subject areas at the same grade levels. It could be particularly useful in other basic skills areas such as reading.

Secondly, this type of approach could be used at all levels (K-12) in mathematics. This would serve to provide continuity in communication and program development.

Thirdly, the possibility exists for a similar program to be established in a variety of subject areas, across all grade levels (K-12). This concept not only would provide extended lines of communication, but would have tremendous implications for the long-range goals of competency-based education in the State of Delaware.

In terms of the Newark School District approach to competency-based education, A Model for the Improvement of Instruction, this project carried additional implications. In November, 1977, a district sub-committee of which this writer was a member, made the following recommendation regarding the implementation of CBE in the Newark School District:

> The committee feels that the present grade level organization need not be changed. However, we feel that a skills continuum should cut across the administrative grade level organization. After the total range of competencies at all grade levels in all content areas have been developed in terms of a skills continuum, district committees should be formed...(to establish promotion requirements). The responsibility of record keeping belongs to the classroom teacher. In terms of coordination, pre-school in-service time must be provided to allow teachers to review checklists for students with whom they will work that school year.

The report of this committee reflects both an awareness of the results of this practicum, as well as procedures for institutionalization.

With modification of the objectives as identified for the Newark School District, other districts might employ similar procedures in accordance with their own goals and objectives. Local input seems essential to the success of this type of articulation project; to make it real to the staff involved.

In addition, the pending desegregation of New Castle County school districts carries with it, implications for adoption of this articulation system on a county-wide basis.

FOLLOW-UP ACTIVITIES

Through the use of this articulation plan during the 1977-78 school year, it is expected that staff suggestions for improvement will lead to modifications within the procedure and/or checklist. As in any educational program, constant examination and evaluation will be necessary and desirable tools of the school and community. Such critical review will be encouraged by the Newark School District.

PRACTICUM OBSERVERS

The following individuals served as observers for this practicum in order to provide evaluative comments upon completion:

Mr. Hellmut F. Bab, Principal
Wilmer E. Shue Middle School
Newark School District
1500 Capitol Trail
Newark, Delaware 19711
Phone: 302-731-2171

Dr. Loren J. Thompson
Director of Instruction
Newark School District
83 East Main Street
Newark, Delaware 19711
Phone: 302-731-2216

Dr. F. Neil Walzl
Supervisor of Mathematics
Newark School District
83 East Main Street
Newark, Delaware 19711
Phone: 302-731-2220

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APPENDIX A

Newark School District
Newark, Delaware

June 8, 1977

Staff Opinion Survey

In order to enhance communication among staff members within the district, your help is solicited in responding to the following questions. Your answers will serve as input to a staff workshop this summer.

Grade Level _____

Subject Area _____

1. During the first two weeks of school in September, what percent of the available instructional time is consumed by diagnostic testing or other placement procedures?

   Comment:

2. Within the first month of school, are you able to examine the cumulative record file for each of your students?

   Comment:

3. How often are you able to communicate with the student's previous teacher regarding individual needs of the student?

   Comment:

4. After the initial diagnosis of student needs is made, what percent of students do you find to be misplaced?

   Comment:

5. Would you find a basic skills checklist from the student's previous teacher, based on daily interaction with the student, to be of value in planning and placement?

   Comment:

Return to: Ken Brown, Shue School

PUPIL MATH SKILL CHECKLIST

I. General Information

Child's Name _____ Birthdate _____ Grade Completed _____

Teacher (5th Grade) _____ School _____

Teacher (8th Grade) _____ School _____

What program(s) has been used with this student? Identify by title, publisher, and level.

_____

_____

_____

_____

Comments that might be of use when planning instructional activities for this child.

_____

_____

_____

_____

I. Skill List - If you feel the student has acquired competence in a given skill at the 90% mastery level, check the block labeled "mastered." If a skill has been introduced but not yet mastered, check the block labeled "introduced." If a skill has not been introduced, leave both blocks blank.

Note: Introduction and/or mastery could have taken place before the child reached your class. In that case you would check the appropriate block.

Basic Skills Computation	Introduced	Mastered	If Applicable, level of Mastery
1. Sums through 20			
2. Addition of whole numbers (without carry)			
3. Addition of whole numbers (with carry)			
4. Subtraction of whole numbers(without borrowing)			
5. Subtraction of whole numbers (with borrowing)			
6. Subtraction of whole numbers (with zeros in the minuend)			
7. Multiplication facts			
8. Multiplication of whole numbers with one digit multiplier			
9. Multiplication of whole numbers with two digit multiplier			
10. Multiplication of whole numbers with three digit multiplier			
11. Division of whole numbers with a one digit divisor (without remainder)			
12. Division of whole numbers with a two digit divisor (without remainder)			
13. Division of whole numbers with a three digit divisor (without remainder)			
14. Division of whole numbers with a one digit divisor (with remainder)			
15. Division of whole numbers with a two digit dividor (with remainder)			
16. Division of whole numbers with a three digit divisor (with remainder)			

	Introduced	Mastered	Applicable, Level of Mastery
17. Addition of fractions with like denominators)			
18. Addition of fractions (with unlike denominators)			
19. Subtraction of fractions (with like denominators)			
20. Subtraction of fractions (with unlike denominators)			
21. Multiplication of fractions			
22. Division of fractions			
23. Addition of decimals			
24. Subtraction of decimals			
25. Multiplication of decimals			
26. Division of decimals with a whole number divisor.			
27. Division of decimals with a decimal divisor.			
28. Factor whole numbers into primes			
29. Compute LCM			
30. Compute GCD			
31. Addition of integers			
32. Subtraction of integers			
33. Multiplication of integers			
34. Division of integers			
35. Utilize Scientific Notation			
Concepts			
1. Read whole numbers through millions			
2. Read numerals from millionths to billions			
3. Write whole numbers through millions			

	Introduced	Mastered	If Applicable, Level of Mastery
4. Write numerals from millionths to billions			
5. Use ordinal numbers			
6. Name the digit and its place value in numerals from millionths to billions			
7. State the meaning of a fraction			
8. State the meaning of a decimal			
9. State the meaning of measurement (a) linear (b) mass (c) volume			
10. Write numerals from millionths to billions in exponential form			
11. Identify plane figures			
12. Identify solid figures	(Continued)		
C. Applications			
1. Measurement			
a. Tell time to the nearest minute			
b. Make change for purchase of $2.00 or less			
c. Read a thermometer 1. Celsius 2. Fahrenheit			
d. Measure Distance 1. Metric 2. Customary			

	Introduced	Mastered	If Applicable, Level of Mastery
e. Measure mass 1. Metric 2. Customary			
f. Measure volume & capacity 1. Metric 2. Customary			
2. Solve Reading Problems a. Single step 1. Below grade level 2. On grade level			
b. Multiple Step 1. Below grade level 2. On grade level			
3. Estimation a. Able to estimate answers to computational problems			
b. Able to estimate answers to reading problems			
c. Can judge whether an answer is "reasonable" or not			
4. Apply divisibility rules			
5. Solve simple number sentences			
6. Compute a percent of a number			
7. Find what percent one number is of another			
8. Given a percent of a number, find the original number			

	Introduced	Mastered	If Applicable, Level of Mastery
9. Solve ratio and proportion problems			
10. Compute the perimeter of: a. squares b. rectangles c. triangles d. trapezoids e. circles			
11. Compute the area of: a. squares b. rectangles c. triangles d. trapezoids e. circles			
12. Compute the volume of: a. rectangular solids b. cylinders c. cones and pyramids d. spheres			
13. Compute a mean			
14. Compute a mediam			
15. Compute a mode			
16. Interpret a graph			
17. Construct: a. a bar graph b. a circle c. a line graph d. a picture graph			
18. Locate points on a rectangular coordinate graph.			
19. Identify coordinates of points located on a rectangular coordinate graph			

Concepts (Continued)	INTRODUCED	MASTERED	IF NOT ABLE LEVEL OF MASTERY
13. Identify line			
14. Identify point			
15. Identify angle			
16. Identify parallel lines			
17. Identify congruent figures			
18. Identify similiar figures			
19. Identify perpendicular lines			

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

WORKSHOP: BASIC SKILLS CHECKLIST
August 15-19, 1977

8:00 A.M. - 1:00 P.M.

PURPOSE: To develop and plan the implementation of a basic skills checklist in mathematics which will serve as a primary vehicle of communication between elementary and middle school teachers regarding the skill development of individual students.

OBJECTIVES: The participants of this workshop will seek to:

1. Modify the existing draft version of the checklist based on pilot usage and teacher suggestions;

2. Develop and finalize procedures for validating the effectiveness of the checklist as it is used by the sixth grade teachers;

3. Develop guidelines for decisions regarding needs and placement of sixth grade students based upon checklist results;

4. Develop plans for instructional programs based upon checklist results.

PARTICIPANTS:

	School
Joan Allesandria	Shue
Franklin Bensinger	Wilson
Rebecca Conway	Medill
Susan Cooper	Wilson
Georgia Cressman	Gauger
Sara Fitzpatrick	Maclary
Mary Keppler	Maclary
Martha McCormick	Wilson
Kathy Price	Maclary
Kevin Sullivan	Maclary
Sandra Towle	Maclary
Janice Trainer	Medill

8/4/77

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

WORKSHOP: BASIC SKILLS CHECKLIST
August 15-19, 1977

Shue School Library

AGENDA

Monday, August 15, 1977

8:00 - 8:30	Introduction - Overview
8:30 - 10:00	Examination of Draft Checklist
10:00 - 10:30	Break and Informal Discussion
10:30 - 12:00	Suggestions for Improvement
12:00 - 1:00	Finalize Checklist

Tuesday, August 16, 1977

8:00 - 8:30	Review and Update
8:30 - 10:00	Examination of Checklist Results from Pilot Usage
10:00 - 10:30	Break and Informal Discussion
10:30 - 12:30	Decision-making (Placement) Based on Checklist Results
12:30 - 1:00	Summary

Wednesday, August 17, 1977

8:00 - 8:30	Progress Update
8:30 - 9:15	Recognizing Needs; Procedures for Placement
9:15 - 10:00	Examination of Commercial Materials
10:00 - 10:30	Break and Informal Discussion
10:30 - 12:30	Developing the Validating Instrument for Sixth Grade
12:30 - 1:00	Summary

Thursday, August 18, 1977

8:00 - 8:30	Update
8:30 - 10:00	Develop Procedures for use of the Validating Instrument
10:00 - 10:30	Break
10:30 - 12:30	Develop Instructional Plans and Materials as a Result of Pre-September Placement (In Accordance with Levels of Ability)
12:30 - 1:00	Summary

Friday, August 19, 1977

8:00 - 8:30	Progress Reports
8:30 - 10:00	Examine, Critique, and Proof all Materials
10:00 - 10:30	Break
10:30 - 12:00	Plan Institutionalization and Follow-up Activities
12:00 - 1:00	Evaluation

8/4/77

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

August 4, 1977

MEMORANDUM TO: All Participants

FROM: Ken Brown

RE: WORKSHOP: BASIC SKILLS CHECKLIST (MATH)

Just a reminder that we will be meeting August 15, 1977 at 8:00 A.M. in the library of the Wilmer E. Shue Middle School, 1500 Capitol Trail, Newark, Delaware.

If you are among the elementary teachers who have completed the draft version of the basic skills checklist for your 1976-77 fifth graders, but are not going to be attending the workshop sessions, please be sure that Dr. Walzl has them by Friday, August 12, 1977. Also, your suggestions for improving the checklist and validating it in grade six would be very much appreciated.

I look forward to seeing you at the workshop. If you should have any questions, please call Newark School District at 731-2220.

Thank you, in advance, for your participation.

KB:jrw

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

MATH SKILLS CHECKLIST

DATE: _____

I. General Information

A. STUDENT: _____ GRADE: _____

TEACHER: _____ SCHOOL: _____

II. Instructional Materials

A. TITLE PUBLISHER LEVEL

_____

_____

_____

B. OTHER COMMENTS:

_____

_____

_____

III. Instructional Setting

A. Homogeneous _____

Heterogeneous _____

Individualized _____

Other _____

B. Regular Instruction

Resource _____

Remedial _____

Tutorial _____

Gifted _____

Other _____

C. Other Comments

MATH SKILLS CHECKLIST

The checklist is composed of three sections: (I) Computation, (II) Concepts, and (III) Applications. Within each section, if you feel that the student has acquired competence at the 70% level of mastery, check the given item as "Mastered." If the item has not been mastered, check "Reviewed" or "Introduced" as appropriate. If the item has not been introduced, leave the space blank. Please feel free to make any appropriate comments regarding the student at any point on the checklist.

I. Computation	Introduced	Reviewed	Mastered
A. Whole Numbers			
1. Sums through 20			
2. Add without carry			
3. Add with carry			
4. Subt. without borrow			
5. Subt. with borrow			
6. Multiply tables			
7. One digit multiplier			
8. Two digit multiplier			
9. Three digit multiplier			
10. One digit divisor			
11. Two digit divisor			
12. Three digit divisor			
13. Prime factorization			
14. Find LCM			
15. Find GCF			

B. Fractions	Introduced	Reviewed	Mastered
1. Add with like denom.			
2. Add with unlike denom.			
3. Add with mixed numerals			
4. Subt. with like denom.			
5. Subt. with unlike denom.			
6. Subt. with mixed numerals			
7. Multiply			
8. Mult. with mixed numerals			
9. Divide			
10. Divide with mixed numerals			
11. Reduce to lowest terms			
C. Decimals			
1. Add			
2. Subtract			
3. Multiply			
4. Divide by whole number			
5. Divide by decimal			
D. Percent			
1. Percent/fraction/decimal form			
2. Find the percentage of a number			
3. Find what percent one number is of another			
4. Find the base number, given the % and percentage			
E. Integers			
1. Add			
2. Subtract			
3. Multiply			
4. Divide			

II. Concepts	Introduced	Reviewed	Mastered
A. Numeration			
1. Use ordinal numbers			
2. Name place value - millionths to billions			
3. Read and write to billions			
4. Read and write to millionths			
5. Use exponential form			
B. Geometry (Identify)			
1. Point, line, place			
2. Parallel and perpendicular lines			
3. Types of angles			
4. Plane figures			
5. Solid figures			
6. Congruent figures			
7. Similar figures			
8. Lines of symmetry			
III. Applications			
A. Numeration			
1. Estimate in computation & problem-solving			
2. Apply divisibility rules			
3. Solve simple equations			
4. Solve ratio and proportion problems			
5. Use bases other than ten			
6. Use scientific notation			
7. Compute mean, median, & mode			

B. Measurement	Introduced	Reviewed	Mastered
1. Tell time			
2. Make change (money)			
3. Read thermometer			
4. Find distance			
5. Find mass			
6. Find volume & capacity			
C. Geometry			
1. Find perimeter of polygons			
2. Find circumference of circles			
3. Find the area of:			
a. squares			
b. rectangles			
c. triangles			
d. trapezoids			
e. circles			
4. Find the volume of:			
a. rectangular solids			
b. cylinders			
c. cones and pyramids			
d. spheres			
D. Graphs			
1. Interpret/Construct:			
a. bar			
b. circle			
c. line			
d. picture			

	Introduced	Reviewed	Mastered
2. Rectangular Coordinates a. Locate points			
b. Identify points			

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

MATHEMATICS DIAGNOSTIC TEST

Directions: Work each problem.
Match your answer with those that are given.
Write the corresponding letter on your answer sheet.

Part I. Computation

1.	13 45 + 31	A.	98	C.	109
		B.	89	D.	Not given
2.	246 + 539	A.	786	C.	885
		B.	303	D.	Not given
3.	695 - 342	A.	1037	C.	333
		B.	353	D.	Not given
4.	503 - 264	A.	767	C.	361
		B.	239	D.	Not given
5.	29 x 7	A.	230	C.	203
		B.	143	D.	Not given
6.	314 x 86	A.	27004	C.	2704
		B.	27104	D.	Not given
7.	738 x 295	A.	216,710	C.	21,711
		B.	217,710	D.	Not given
8.	$6/\overline{453}$	A.	12	C.	75 r3
		B.	75	D.	Not given
9.	$18/\overline{765}$	A.	60	C.	51
		B.	42 r9	D.	Not given
10.	$456/\overline{8619}$	A.	18 r411	C.	108
		B.	18 r11	D.	Not given

11. Find the prime factors of 54.

A. 2 x 3 x 3 x 3

B. 9 x 6

C. 3 x 3 x 6

D. Not given

12. Find the least common multiple of 6 and 9.

A. 6 C. 54
B. 18 D. Not given

13. Find the greatest common factor of 8 and 12.

A. 4 C. 12
B. 96 D. Not given

14. $\frac{5}{8} + \frac{2}{8}$

A. $\frac{7}{16}$ C. $\frac{7}{8}$
B. $\frac{3}{8}$ D. Not given

15. $\frac{2}{3} + \frac{1}{6}$

A. $\frac{5}{6}$ C. $\frac{5}{12}$
B. $\frac{3}{9}$ D. Not given

16. $4\frac{4}{5} + 8\frac{3}{5}$

A. $12\frac{2}{5}$ C. $13\frac{3}{5}$
B. $13\frac{1}{5}$ D. Not given

17. $\frac{7}{9} - \frac{5}{9}$

A. $\frac{1}{9}$ C. $\frac{2}{9}$
B. $\frac{5}{9}$ D. Not given

18. $\begin{array}{r} \frac{5}{6} \\ -\ \frac{1}{3} \\ \hline \end{array}$

A. $\frac{4}{3}$ C. $\frac{5}{18}$

B. $\frac{1}{2}$ D. Not given

19. $\begin{array}{r} 6\ \frac{1}{4} \\ -\ 2\ \frac{3}{4} \\ \hline \end{array}$

A. $4\ \frac{1}{2}$ C. $3\ \frac{1}{2}$

B. $4\ \frac{1}{4}$ D. Not given

20. $\frac{3}{10} \times \frac{5}{8} \times \frac{4}{9}$

A. $\frac{1}{12}$ C. $\frac{12}{27}$

B. $\frac{5}{12}$ D. Not given

21. $2\ \frac{2}{3} \times 4\ \frac{1}{2}$

A. 12 C. $\frac{1}{12}$

B. $8\ \frac{1}{3}$ D. Not given

22. $\frac{5}{6} \div \frac{2}{3} =$

A. $\frac{10}{18}$ C. $\frac{5}{9}$

B. $1\ \frac{1}{4}$ D. Not given

23. $1\ \frac{4}{5} \div \frac{3}{10} =$

A. 6 C. $1\ \frac{6}{25}$

B. $\frac{1}{6}$ D. Not given

24. Reduce $\frac{10}{12}$ to lowest terms:

A. $\frac{5}{7}$ C. $\frac{2}{6}$

B. $\frac{2}{3}$ D. Not given

25. Change $\frac{10}{4}$ to a mixed numeral in simplest form.

A. 2 C. $2\ \frac{1}{2}$

B. $2\ \frac{1}{4}$ D. Not given

26. $\begin{array}{r} 2.25 \\ +16.341 \\ \hline \end{array}$

A. 16.566
B. 185.91
C. 18.591
D. Not given

27. $\begin{array}{r} 36.04 \\ -\ 17.183 \\ \hline \end{array}$

A. 18.863
B. 18.857
C. 53.223
D. Not given

28. $\begin{array}{r} 5.07 \\ \times\ .38 \\ \hline \end{array}$

A. 192.66
B. 1.9266
C. 1.8166
D. Not given

29. $9/\overline{3.78}$

A. .42
B. .042
C. 42
D. Not given

30. $.08/\overline{16.8}$

A. 2.1
B. 21.0
C. 210
D. Not given

31. $6 + (^{-}10) =$

A. 16
B. 4
C. $(^{-}4)$
D. Not given

32. $6 - (^{-}10) =$

A. 16
B. 4
C. (-4)
D. Not given

33. $6 \times (^{-}10) =$

A. 16
B. 60
C. $(^{-}60)$
D. Not given

34. $9 \div (^{-}3) =$

A. 27
B. $(^{-}3)$
C. 3
D. Not given

35. $\frac{9}{10} = .90 =$

A. 9%
B. .9%
C. 90%
D. Not given

36. 50% = .5 =

A. 5
B. $\frac{1}{2}$
C. $\frac{5}{100}$
D. Not given

37. 50% of 100 =

A. 500
B. 50
C. 5
D. Not given

38. 75% of 300 =

A. 75
B. 225
C. 22500
D. Not given

39. 8 = ___ % of 32

A. 4
B. 256
C. 25
D. Not given

40. 30% of ___ = 24

A. 80
B. 72
C. 720
D. Not given

Part II: Concepts

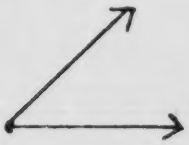
Section A: Numeration - Oral Test

987654.3021

1. What digit is in the thousands column?
2. What digit is in the hundredths column?
3. What digit is in the ten thousands column?
4. What digit is in the fifth column from the left of the decimal?
5. Write 5.16 in words.
6. Write 1000 in exponential form.
7. What does 3^2 equal?
8. Write 4095 in words.

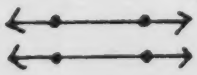
Section B: Geometry

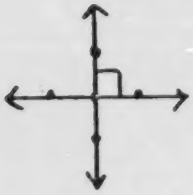
Match each picture with its name and record the correct letter on your answer sheet.

9. 

10.

11.

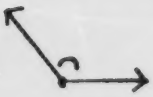
12. 

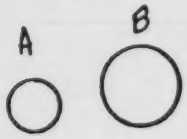
13. 

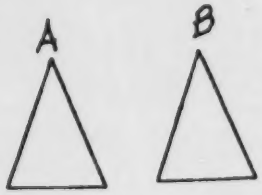
14.

A. Line
B. Right Angle
C. Similar figures
D. Point
E. Acute Angle
F. Parallel lines
G. Plane figure
H. Perpendicular lines
I. Obtuse Angle
J. Congruent figures
K. Solid figure
L. Lines of symmetry

15.

16. 

17. 

18. 

Part III. Applications

1. What is the best estimate for 38 x 42?
   A. 1600
   B. 2000
   C. 1200
   D. Not given

2. $26\overline{)685}$
   A. 30
   B. 300
   C. 3
   D. Not given

3. Is 561 divisible by:
   A. 2
   B. 3
   C. 5
   D. Not given

4. If n x 4 = 20, then n =
   A. $\frac{4}{20}$
   B. 5
   C. 80
   D. Not given

5. If n ÷ 7 = 4, then n =
   A. $\frac{7}{4}$
   B. 3
   C. 28
   D. Not given

6. If $\frac{n}{12} = \frac{15}{20}$, then n =
   A. 9
   B. 10
   C. 8
   D. Not given

7. What does 23_5 equal in base ten?
   A. 115
   B. 13
   C. 5
   D. Not given

8. Write 651 in scientific notation.
   A. $.651 \times 10^3_2$
   B. 6.51×10^2
   C. 65.1×10^1
   D. Not given

9. The average of 9, 11, and 20 is
   A. 9
   B. 20
   C. 11
   D. Not given

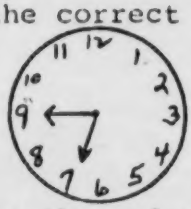
10. Find the median of 29, 19, 18, 16, and 13.
    A. 29
    B. 19
    C. 18
    D. Not given

11. Find the mode of 89, 75, 75, 70, and 66.

A.
B. 75
C. 66
D. Not given

Measurement

12. Choose the correct time.

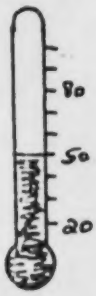


A. 7:45
B. 6:45
C. 9:35
D. Not given

13. John gave the salesperson $10.00 for a $4.67 purchase. How much change did he receive?

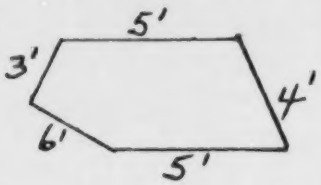
A. $5.33
B. $6.37
C. $6.67
D. Not given

14. What is the temperature?



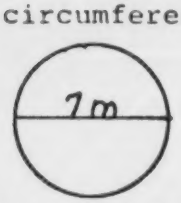
A. 80°
B. 30°
C. 50°
D. Not given

15. Find the perimeter of this figure.



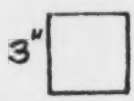
A. 23'
B. 18'
C. 24'
D. Not given

16. Find the circumference. ($C = \pi d$, $\pi = \frac{22}{7}$)



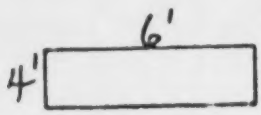
A. 7 m
B. 22 m
C. $\frac{22}{7}$ m
D. Not given

17. Find the area of this square.



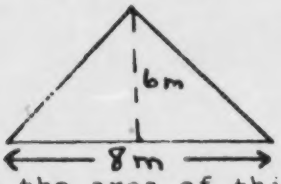
A. 12 sq. in.
B. 6 sq. in.
C. 9 sq. in.
D. Not given

18. Find the area of this rectangle.



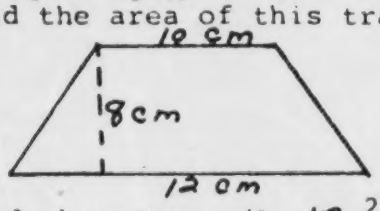
A. 20 sq. ft.
B. 24 sq. ft.
C. 10 sq. ft.
D. Not given

19. Find the area of this triangle.



A. 48 m^2
B. 14 m^2
C. 24 m^2
D. Not given

20. Find the area of this trapezoid.



A. 22 cm^2
B. 88 cm^2
C. 96 cm^2
D. Not given

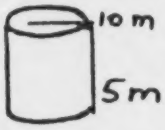
21. Find the area: ($A = \pi r^2$, $\pi = 3.14$)

A. 314.0 sq. ft.
B. 62.8 sq. ft.
C. 31.4 sq. ft.
D. Not given

22. Find the volume of a cube with each side equal to 5 cm.

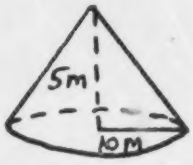
A. 25 cm^3
B. 125 cm^3
C. 15 cm^3
D. Not given

23. Find the volume of this cylinder.
($V = \pi r^2 h$, $\pi = 3.14$)



A. 1570 m^3
B. 314.0 m^3
C. 50 m^3
D. Not given

24. Find the volume of this cone.
($V = \frac{1}{3}\pi r^2 h$, $\pi = 3.14$)



A. 1570 m^3
B. 314.0 m^3
C. 50 m^3
D. Not given

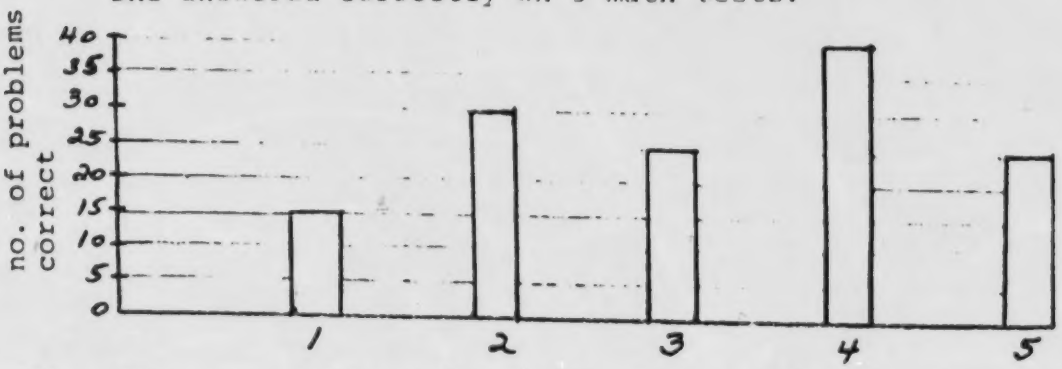
25. Find the volume of a sphere with a radius of 1".

($V = \frac{4}{3}\pi r^3$, $\pi = \frac{22}{7}$)

A. 3.14 cu. in.
B. $\frac{22}{7}$ cu. in.
C. $4\frac{4}{21}$ cu. in.
D. Not given

Use the following bar graph to answer questions 26 - 28.

Betsy made a graph to show the number of problems she answered correctly on 5 math tests.



26. How many problems did Betsy answer correctly on Test 2?

A. 25 B. 33 C. 30 D. Not given

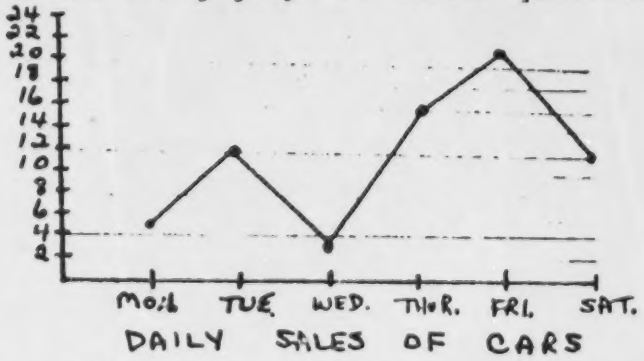
27. On which test did Betsy get exactly 35 problems correct?

A. 5 B. 3 C. 2 D. Not given

28. How many more problems did Betsy answer on Test 1 than on Test 5?

A. 20 B. 10 C. 15 D. Not given

Use the following graph to answer questions 29 - 31.



29. On which day were car sales the greatest?

A. Fri. B. Thur. C. Wed. D. Not given

30. What was the total number of cars sold on Sat. and Mon.?

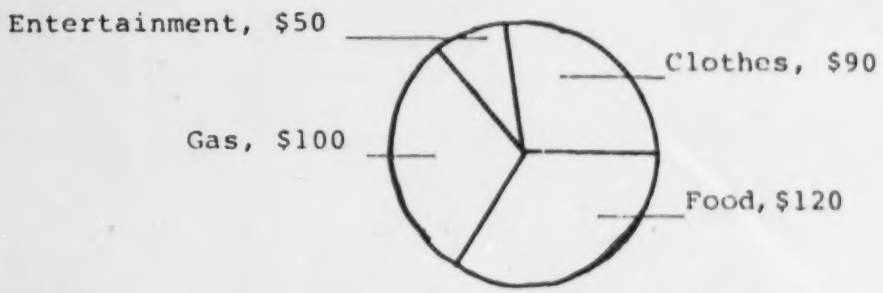
A. 17 B. 5 C. 12 D. Not given

31. How much greater were the car sales on Fri. than Wed.?

A. 17 B. 20 C. 19 D. Not given

Use the next graph to answer questions 32 - 34.

The following graph shows how marc spends his money.



32. How much more does he spend for food than gas?

A. $40 B. $35 C. $20 D. Not given

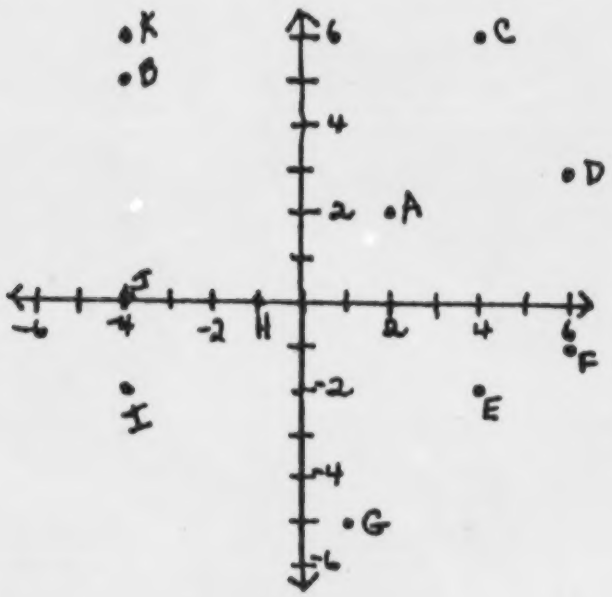
33. How much more does he spend for clothes and food than entertainment and gas?

A. $60 B. $55 C. $65 D. Not given

34. What % does he spend on clothing?

A. 30% B. 35% C. 20% D. Not given

Study the graph below and answer the following questions.



35. Find the point located at (2,2).

A. E B. I C. A D. Not given

36. Find the point located at (4,6).

A. K B. C C. D D. Not given

37. Find the point located at (-4,0).

A. H B. G C. J D. Not given

38. Find the point located at (-4,-2).

A. C B. I C. E D. Not given

39. What are the coordinates of point G?

A. (6,-1) B. (-1,6) C. (6,3) D. Not given

40. What are the coordinates of point D?

A. (6,3) B. (-4,6) C. (6,5) D. Not given

41. What are the coordinates of point H?

A. (-4,0) B. (-1,0) C. (1,0) D. Not Given

42. What are the coordinates of point K?

A. (-4,-6) B. (6,4) C. (-4,6) D. Not Given

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

MATHEMATICS DIAGNOSTIC TEST - ANSWER KEY
(TEACHER USE ONLY)

Part I. Computation

1.	B	14.	C	27.	D
2.	D	15.	A	28.	B
3.	B	16.	D	29.	A
4.	B	17.	C	30.	C
5.	C	18.	B	31.	C
6.	A	19.	C	32.	A
7.	B	20.	A	33.	C
8.	C	21.	A	34.	B
9.	B	22.	B	35.	C
10.	A	23.	A	36.	B
11.	A	24.	D	37.	B
12.	B	25.	C	38.	B
13.	A	26.	C	39.	C
				40.	D

Part II. Concepts

Section A: Numeration - Oral

1.	7	5.	five and sixteen hundredths
2.	0	6.	10
3.	8	7.	9
4.	5	8.	four thousand ninety-five

Section B: Geometry - Matching

9.	E	12.	F	15.	G	18.	J
10.	D	13.	H	16.	I		
11.	A	14.	K	17.	C		

Part III. Applications

1.	A	12.	B	23.	A	34.	B
2.	A	13.	A	24.	D	35.	C
3.	B	14.	C	25.	C	36.	B
4.	B	15.	A	26.	C	37.	C
5.	C	16.	B	27.	D	38.	B
6.	A	17.	A	28.	B	39.	D
7.	B	18.	B	29.	A	40.	A
8.	B	19.	C	30.	A	41.	B
9.	D	20.	B	31.	D	42.	C
10.	C	21.	A	32.	C		
11.	B	22.	B	33.	A		

MATHEMATICS DIAGNOSTIC TEST - ANSWER SHEET

NAME _____

TEACHER _____ DATE _____

Part I: Computation

1.	_____	21.	_____
2.	_____	22.	_____
3.	_____	23.	_____
4.	_____	24.	_____
5.	_____	25.	_____
6.	_____	26.	_____
7.	_____	27.	_____
8.	_____	28.	_____
9.	_____	29.	_____
10.	_____	30.	_____
11.	_____	31.	_____
12.	_____	32.	_____
13.	_____	33.	_____
14.	_____	34.	_____
15.	_____	35.	_____
16.	_____	36.	_____
17.	_____	37.	_____
18.	_____	38.	_____
19.	_____	39.	_____
20.	_____	40.	_____

Part II. Concepts

Section A. Numeration-Oral

1.	_____	2.	_____
3.	_____	4.	_____
5.	_____		
	_____		
6.	_____	7.	_____
8.	_____		
	_____		

Section B. Geometry-Matching

9.	_____	14.	_____
10.	_____	15.	_____
11.	_____	16.	_____
12.	_____	17.	_____
13.	_____	18.	_____

Part III. Applications

1.	_____	15.	_____	29.	_____
2.	_____	16.	_____	30.	_____
3.	_____	17.	_____	31.	_____
4.	_____	18.	_____	32.	_____
5.	_____	19.	_____	33.	_____
6.	_____	20.	_____	34.	_____
7.	_____	21.	_____	35.	_____
8.	_____	22.	_____	36.	_____
9.	_____	23.	_____	37.	_____
10.	_____	24.	_____	38.	_____
11.	_____	25.	_____	39.	_____
12.	_____	26.	_____	40.	_____
13.	_____	27.	_____	41.	_____
14.	_____	28.	_____	42.	_____

Scores:

Part I _____

Part II _____

Part III _____

GRAND TOTAL _____

NEWARK SCHOOL DISTRICT
OFFICE OF THE DIRECTOR OF INSTRUCTION
NEWARK, DELAWARE

WORKSHOP OPINION SURVEY

(Please indicate your response on the scale provided)

1.	Preparation by leader:	5 4 3 2 1 Adequate Inadequate
2.	Inclusion of pertinent topics:	5 4 3 2 1 Sufficient Insufficient
3.	Budgeting of time:	5 4 3 2 1 With Wisdom Wasteful
4.	Explanation of Objectives:	5 4 3 2 1 Thorough Incomplete
5.	Participant's Awareness of Objectives:	5 4 3 2 1 Clear Vague
6.	Length of Time of Workshop:	5 4 3 2 1 Sufficient Too Short
7.	Physical facilities:	5 4 3 2 1 Suitable Unsuitable
8.	Resource materials and/or personnel:	5 4 3 2 1 Available Lacking
9.	Variety of Activities:	5 4 3 2 1 Sufficient Insufficient
10.	Accomplishment of Objectives:	5 4 3 2 1 To a great extent Not at all

COMMENTS: (Use back of page)

1. Strengths of Workshop
2. Weaknesses of Workshop
3. Suggestions for the future:
   (Please give thought to this. Your suggestions will be used in planning for next year. This is your opportunity for input in the District's workshop planning. Thank you.)

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NAME OF WORKSHOP

mjh

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

WORKSHOP: BASIC SKILLS CHECKLIST
August 15-19, 1977

Participant Evaluation

1. Did the workshop provide the opportunity for you to have input for modifying the draft checklist?

   Comment:

2. Did the workshop provide the opportunity for you to have input in developing the validating procedures for checklist usage?

   Comment:

3. Did the workshop provide an avenue for teacher to teacher communication?

   Comment:

4. Did the workshop provide you with the opportunity for instructional planning?

   Comment:

5. Did the workshop meet your expectations?

   Comment and Suggestions:

8/4/77

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

WORKSHOP: BASIC SKILLS CHECKLIST
August 15-19, 1977

Participant Evaluation (SUMMARY)

1. Did the workshop provide the opportunity for you to have input for modifying the draft checklist?

   Comment: (1) YES- ALL PARTICIPANTS
   (2) A GOOD FLOW OF IDEAS.

2. Did the workshop provide the opportunity for you to have input in developing the validating procedures for checklist usage?

   Comment: (1) YES- ALL PARTICIPANTS
   (2) FOR THE FIRST TIME, WE HAVE OUR OWN TEST.

3. Did the workshop provide an avenue for teacher to teacher communication?

   Comment: (3) YES- ALL PARTICIPANTS
   (2) IT WAS GOOD TO HAVE ELEMENTARY/MIDDLE TEACHERS MIX.

4. Did the workshop provide you with the opportunity for instructional planning?

   Comment: (1) YES- ALL PARTICIPANTS
   (2) DEFINATE PROCEDURES FOR IMPLEMENTATION WERE ESTABLISHED.

5. Did the workshop meet your expectations?

   Comment and Suggestions:
   (1) YES- ALL PARTICIPANTS
   (2) ABOVE EXPECTATIONS
   (3) COMMUNICATION WAS BETTER THAN EXPECTED.

8/4/77

NEWARK SCHOOL DISTRICT
OFFICE OF THE DIRECTOR OF INSTRUCTION
NEWARK, DELAWARE

WORKSHOP OPINION SURVEY

(Please indicate your response on the scale provided)

		MEAN	5 4 3 2 1
1.	Preparation by leader:	5.0	Adequate ... Inadequate
2.	Inclusion of pertinent topics:	5.0	Sufficient ... Insufficient
3.	Budgeting of time:	5.0	With Wisdom ... Wasteful
4.	Explanation of Objectives:	5.0	Thorough ... Incomplete
5.	Participant's Awareness of Objectives:	4.6	Clear ... Vague
6.	Length of Time of Workshop:	5.0	Sufficient ... Too Short
7.	Physical facilities:	3.6	Suitable ... Unsuitable
8.	Resource materials and/or personnel:	4.8	Available ... Lacking
9.	Variety of Activities:	5.0	Sufficient ... Insufficient
10.	Accomplishment of Objectives:	5.0	To a great extent ... Not at all

COMMENTS: (Use back of page)

1. Strengths of Workshop (1) OPPORTUNITY FOR INPUT.
   (2) EXCELLENT, WELL-ORGANIZED
2. Weaknesses of Workshop -NONE LISTED
3. Suggestions for the future:
   (Please give thought to this. Your suggestions will be used in planning for next year. This is your opportunity for input in the District's workshop planning. Thank you.)

mjh

APPENDIX L 6-6

DIAGNOSTIC TEST RESULTS

Name	Check List	Part I	Part II	Part III	Total
Bevans, Aaron		7	6	16	29
Binder, Matthew	156	10	13	23	46
Buchanan, Cheryl	149	24	10	22	56
Coolidge, Robert		16	4	20	40
Dale, John	77	1	4	10	15
Dickerson, Kimberly	69	13	5	14	32
Dill, Lisa	116	17	10	14	41
Dobies, Richard	142	11	6	22	39
Fair, Robert	161	28	13	23	64
Flowers, Lisa	126	8	6	13	27
Fries, Jeffrey	124	10	5	15	30
Hammond, Karen		25	11	21	57
Haskins, Mary Denise	37	9	1	11	21
Helsel, Diane	108	18	6	24	48
Irwin, Kenneth	139	10	7	20	37
Lalli, Eric	78	10	4	15	29
Lloyd, Frank		19	4	16	39
Magiros, Irene	146	16	7	15	38
Matyas, Denise	75	7	4	6	17
Meier, Emmett	132	16	9	17	42
Mulrooney, Christine	146	19			
Pohorily, August	138	8			
Remy, Mark	93	15	7	25	47
Ries, Mary	106	20	8	25	53
Riggs, James	84	9	3	11	23
Rutherford, Jimmy		12	8	15	35
Stopyra, Robert	75	4	3	10	17
Tower, Matthew	165	16	8	19	43

DIAGNOSTIC TEST RESULTS

Name	Check List	Part I	Part II	Part III	Total
Bashore, Robert	154	21	11	23	55
Baynard, Susan	126	24	11	19	54
Byerly, Michelle	132	19	10	16	45
Chao, Min	106	19	12	20	51
Clancy, Richard		11	4	13	28
Crenshaw, Sonja	51	7	3	14	24
Crump, Stephen	150	16	8	24	48
Delgenio, James	159	19	10	22	51
Evans, Lizabeth	159	15	13		
Forgue, Robert	127	18	7	15	40
Gasz, Elizabeth	133	27	14	22	63
Gunkle, Luwannah	135	15	8	22	45
Henry, Aden	138	23	10	29	62
Holmquist, Amy	149	13	9	23	45
Hurst, Damon	90	12	2	8	22
Laznik, Joseph	145	26	5	15	46
Lyons, Martha		12	4	17	33
McCauley, Kasey	164	24	11	24	59
McMullen, James	128	18	10	14	42
Moore, Glenn		11	4	17	32
Myers, Cathy	137	13	8	15	36
Roberts, Kevin	160	20	9	20	49
Shaw, Julia	132	10	9	18	37
Sullivan, Thomas	121	9	5	10	24
Tucker, Pelton	82	4	0	0	4
Twohig, Mark	75	15	6	11	32
Vercoe, Lynn M.		18	10	17	45

DIAGNOSTIC TEST RESULTS

Name	Check List	Part I	Part II	Part III	Total
Aulen, Kristina	177	25	11	23	59
Boyd, Jeffry	128	10	5	14	29
Buckingham, Amy		21	7	19	47
Cerroni, Alphonse	74	9	3	8	20
Conkey, Sharon	81	9	3	10	22
Eidem, Patricia	154	23	8	22	53
Feehrer, Linda	137	11	10	13	34
Flynn, Terrence	146	17	1	19	37
Groff, Diana	166	22	11	26	59
Handlin, Dawn	129	17	8	16	41
Himmler, Kenneth		7	6	13	26
Knutsen, Erik	70	11	3	7	21
Luff, Barbara	134	9	11	10	30
McEvoy, Andrew		9	4	13	26
Mercer, Veronica		14	7	10	31
Pelletier, Marc	150	23	8	17	48
Pezone, Betsy	148	23	9	22	54
Richardson, James	69	8	1	12	21
Ross, Ricky		14	3	17	34
Rowe, Paul	154	21	9	24	54
Smith, Elizabeth	76	5	3	9	17
Smith, Louise	131	15	9	25	49
Stone, Mark	76	7	3	16	26
Stowell, Shawn	153	24	9	25	58
Weaver, Chadley	133	9	8	17	34
Zdrojewski, Mary		23	10	28	61
Zelek, Donald	140	20	10	23	53

Mrs. Alessandria

6-9

DIAGNOSTIC TEST RESULTS

Name	Check List	Part I	Part II	Part III	Total
Atkinson, James	81	15	3	13	31
August, Vicki	163	25	13	28	66
Bailey Robert S.	101	12	6	17	35
Bennett, Mark	112	8	5	19	32
Brunt, Anne	75	16	5	19	30
Bull, Dwayne		14	6	10	30
Chandler, Sherry	80	12	6	11	29
Delp, Gregory	61	8	2	18	28
Earhart, Michelle	145	23	11	22	56
Everest, Andrew	75	12	3	18	33
Griffin, Denise	128	19	7	23	49
Hicken, Timothy	130	17	10	18	45
Jones, Robert		8	2	9	19
Kramedas, Katrina	148	21	5	21	47
Lennon, Nancy	178	28	11	27	66
McElhinney, John	75	17	5	15	37
Miller, Cheryl	136	21	10	21	52
Owens, Carl	127	17	8	18	43
Phillips, Rebecca	134	23	6	21	50
Simpson, Gary	137	11	8	18	37
Smith, Brian	164	23	10	26	59
Sniegowski, Gregory	150	18	12	27	57
Sumits, Tracey	106	23	8	29	60
Toy, Richard	61	6	2	16	24
Wynne, Lisa	138	19	5	13	37
Yackoski, Kimberly	135	21	2	22	45
Yokimcus, Victor	161				

Mrs. Alessandria

DIAGNOSTIC TEST RESULTS

6-10

Name	Check List	Part I	Part II	Part III	Total
Ambersino, Julie	141	12	9	18	39
Bailey, Harry	56	13	1	7	21
Bara, Timothy	144	22	10	22	54
Baylis, Robert		12	9	17	38
Blumberg, Anton		6	0	7	13
Brady, Christine	141	14	7	15	36
Brandt, David	128	14	7	19	40
Castagna, Linda	106	9	6	14	29
Chambers, Michele				12	12
Dettro, Timothy	68	16	5	16	37
Diezel, Jeneane	157	20	10	28	58
Dillon, John	79	20	4	9	33
French, Diane	106	20	7	26	53
Gravatt, Susan	93	19	6	14	39
Hanson, Paul	138	17	6	15	38
Hartnett, Edith		18	4	12	34
Jorgensen, Milton	83	6	2	12	20
Krepshaw, Denise Ann		13	4	22	39
Lucas, Nancy Anne	157	20	12	25	57
Margherita, Vincent	116	13	10	14	37
O'Dell, Randall	146	22	6	17	55
Risak, Loreen	132	10	5	21	36
Samuels, Jack	164	28	14	27	69
Schofield, Kimberly	153	14	9	22	45
Simpkins, Timothy	128	16	4	25	45
Thomure, Madeleine	128	7	7	16	30
Tompkins, Daniel	159	24	14	31	69
Wyant, Warren	56	18	8	16	42

STATISTICAL RESULTS

The table displays the statistical evaluation for paired observations using the Olivetti Underwood Programma 101. The checklist scores are paired with the scores from Part I, Part II, Part III, and the total score of the checklist validating instrument.

MEASURE	CHECKLIST	I	II	III	TOTAL
PEARSON'S CORR.		.5949	.7629	.6614	.7693
MEAN	121.1801	15.7280	7.2456	18.0176	40.8828
QUAD. MEAN	125.7641	16.8894	7.9615	18.9801	43.1070
VARIANCE	1132.0050	37.8844	10.8872	35.6138	186.8129
STD. DEV.	33.6452	6.1550	3.2995	5.9677	13.6679
COEFF. VAR.	.2776	.3913	.4553	.3312	.3343
STD. ERROR	3.1934	.5764	.3090	.5613	1.2973